8 A Case for Radical Acceleration: Programs of the Johns Hopkins University and the University of Washington

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Abstract

Common arguments for and against accelerated pacing are presented. The conclusion is reached that educational programs must be adapted to fit the needs of the intellectually talented student. SMPY at The Johns Hopkins University and the Child Development Research Group at the University of Washington, both of which espouse curricular flexibility and emphasize radical acceleration, are described and exemplified by individual case studies. The description of the Washington program stresses the Radical Acceleration Group of the Early Entrance Program (EEP). This aspect of the program involves early entrance to the University of Washington for those students 14 years old and under, not yet in the tenth grade, who score better than college freshmen on the Washington Pre-College Test. Providing a structured support system, the program aids in the transition from junior-high to college-level work. Although some problems have been encountered, overall the students have made satisfactory academic and social progress in college.

The purpose of this paper is to discuss arguments for and against the accelerated pacing of intellectually precocious children in the educational system and to describe the experience of two programs that promote radical acceleration of highly talented young people.

It is customary to refer to the practice of permitting intellectually talented children to move to more difficult levels of a curriculum as "educational acceleration." This phrase implies that the advancement is a result of educational practice, as though somehow an educational method had been discovered that can speed up the inherent rate of a child's development. At the opposite end of the continuum, one does not refer to "educational retardation" but to "mental retardation," a description of the slowed pace of intellectual development. It would be more accurate, similarly, to refer to "mental acceleration" and to acknowledge that educational adaptations are responsive to, but usually are not largely responsible for, the mental advancement of gifted children.

A central conclusion of the present paper is that the pace of educational programs must be adapted to the capacities and knowledge of individual children. In a few instances, the appropriate fit of child and program calls for placement several levels above the child's age-mates and is termed "radical acceleration." The rationale behind the position to be advanced is grounded in the bedrock of developmental psychology as it has evolved, theoretically and empirically, during the past century. The propositions that follow may seem so obvious that they are no longer worth stating. Their triteness, however, is of particular significance because of the regularity with which they are ignored by educators of gifted students.

Premise 1. Learning is a sequential, developmental process. Attainment of skills, understanding in domains of knowledge, and strategies for solving problems are all acquired gradually and in sequences that are more or less predictable (Hilgard & Bower 1974). The learning of language, reading, and mathematics, and the understanding of logical and scientific relationships, proceed in orderly patterns that have been well described, if not altogether understood (Gagné 1965; Rohwer 1970).

Premise 2. Effective teaching must involve a sensitive assessment of the individual's status in the learning process and the presentation of problems that slightly exceed the level already mastered. Too-easy tasks produce boredom; too-difficult tasks cannot be understood. This is what Hunt (1961) referred to as "the problem of the match," which is based on the principle that learning occurs only when there is "an appropriate match between the circumstances that a child encounters and the schemata that he has already assimilated into his repertoire" (p. 268). Hunt notes that "this principle is only another statement of the educator's adage that 'teaching must start where the learner is'" (p. 268).

Premise 3. There are substantial differences in learning status among individuals of any given age. Acquisition of knowledge and the development of patterns of cognitive organization follow predictable sequences, but the rates with which children progress through these sequences vary considerably (Bayley 1955, 1970; George, Cohn, & Stanley 1979; Keating 1976; Keating & Stanley 1972; Robinson & Robinson 1976). Individual dif-

ferences characterize both the rate of overall cognitive development (i.e., general intelligence) and the acquisition of specific skills (e.g., reading).

Despite the axiomatic character of these truisms, current educational "wisdom" about the education of gifted children flies baldly in their face. If it is true that learning is a sequential process, that effective teaching must be grounded where the learner is, and that there are striking differences in developmental rate among individuals of the same age, then how do we justify an educational system that ignores competence and utilizes age to place students for the purpose of educating them?

In the schools of all fifty of the United States, classes are organized by age of pupils, and deviation from age-graded placement is disapproved of. Children who are slow learners are socially promoted until their deviance from the class mean becomes intolerable; exceptionally precocious children are advanced with their age-mates no matter what their deviance from the class mean. Even most special programs for gifted children tend to assume that students will advance one grade per year.

Most teachers, however, do try their best to accommodate to the different learning rates of their pupils. They may create smaller subgroups within the classroom, allowing students to do special projects or even to study a more advanced textbook on their own. These adjustments, however, tend to be piecemeal, inconsistent from one year to the next, and sometimes conflicting (as when children who have mastered a more advanced level of reading or mathematics must repeat the curriculum when they reach "the right age for it"). Seldom do schools take the very sensible step of utilizing their own resources – existing classes at more advanced grade levels – for academically advanced children.

The rigid correspondence between age and grade placement is a new phenomenon in American education and rarely characterizes programs outside the large bureaucracy that constitutes the present-day educational establishment. Not only the fabled one-room schoolhouse but also larger school districts formerly permitted a considerable degree of flexibility in advancing or holding back students in order to achieve a reasonable match between placement and competence (Kett 1974). Prior to World War II one typically found some mixture of ages represented in the classroom. In Terman's study (Terman & Oden 1947, 1959), for example, most of the children with IQs of 140+ were accelerated one or more grade levels by the time of graduation from high school.

In many realms of education we easily accept the principle of placement according to competence. Music and sports instructors, for example, clearly place higher value on skill and attainment than on age. Child prodigies in the performing arts and athletics have always been recognized and applauded, while adult pupils in many skill areas have been welcomed as beginners at any age. Even the most bureaucratic school systems often sup-

port orchestras in which children advance according to talent and competence, sports programs in which age is a minor consideration, and science and art fairs that reward excellence, not seniority. The age-graded system is not inevitable or preordained; it is a modern invention motivated largely by egalitarian goals. In the process of equalizing educational opportunity, however, the rights of many children to an appropriate education have been abrogated.

Rationale for the Age-Graded System of Education

What are the fundamental reasons for an age-graded educational system? The one most often proposed is that advancing students according to their demonstrated mastery of subject areas fails to take into consideration the level of their social competencies and their emotional strengths and weaknesses (Hildreth 1966; Hollingworth 1929). Social and emotional maturity is thought to correspond rather specifically to chronological age (Gold 1965; Rothman & Levine 1963). It is argued that intellectual and academic accomplishments indicate very little about social and emotional development and that to advance individuals according to their progress in one domain may seriously jeopardize healthy progress in the other areas and impair the child's immediate adjustment as well as his or her future mental health (see, e.g., Congdon, 1979).

More than two hundred articles that I have examined report experiences of students who have, in one way or another, been advanced in school because they appeared to be academically ready for a challenge beyond their years. Some reported on students who were granted early admission to kindergarten or first grade, others on students who skipped one or more grades, and still others on students who earned college credit while in high school or who entered college early. Not one of these studies lends credence to the notion that such practices lead to major difficulties for the students involved. It is, indeed, much easier from the available evidence to make the case that students who are allowed to move ahead according to their competencies are benefited in their social and emotional development than it is to make the case that they are harmed. Reviewers who have examined this issue (Daurio 1979; Gallagher 1975; Newland 1976) have arrived at essentially the same conclusion. As Keating (1979) observed, "As for the socio-emotional concerns, it seems time to abandon them unless and until some solid reliable evidence is forthcoming that indicates real dangers in well-run programs" (p. 218).

A second objection to allowing academically advanced students to progress at their own pace stresses the importance of the academic experiences that would be lost if they were moved ahead of their age peers. Grade skip-

ping is said to produce gaps in knowledge because students miss important learning experiences (Hildreth 1966). The argument is not entirely specious. There is a danger that gaps may occur when significant portions of a curriculum are omitted. Few children are likely to invent logarithms and few are likely on their own to memorize the multiplication tables. Although skipping grades may not be the best alternative, there is little evidence to support the position that bright students who do skip are afflicted with substantial lacunae in their knowledge base (Keating 1976; Stanley, Keating, & Fox 1974). Specific gaps that do appear can usually be handled by brief, targeted, individual tutoring. Missed subject matter in nonsequential subjects, such as history and English, can be acquired at many different levels in elementary and secondary schools, as well as through college work and by independent study.

A third argument against acceleration, which is closely related to the second, is that valuable nonacademic experiences will be eliminated by rapid advancement through the system (Rothman & Levine 1963). One cannot, of course, be president of the junior class if one skips the junior year, and it does seem very unlikely that a 12-year-old will be able to play with his high-school football team. It is not clear, however, just how far this argument should be extended. A student who is younger than his or her classmates may well be permitted to edit the school paper, participate in the debate club, or go out for noncontact sports. The available evidence suggests, in fact, that age *per se* is not an important determiner of extracurricular activities. Indeed, in a study of high-school performance of individuals who were younger than average because they had been admitted to kindergarten at an early age, Hobson (1963) found that underage students "engaged in a significantly larger average number of extracurricular activities over a four-year period. Their activity participation was not overly weighted with activities of a scholastic nature. Athletic and social honors and elective positions came in for their full share of underage participation. . . . In the matter of honors, awards, and distinctions at graduation the underage boys and girls exceeded their fellows by a ratio of about two to one" (p. 168).

Many other arguments have been advanced to support the practice of keeping children with their chronological age peers, but the evidence for or against them is difficult to marshal. It has been proposed, for example, that the fact that a child is accelerated in intellectual development and the attainment of academic skills at one age does not guarantee that he or she will be similarly advanced at a later age. It is also asserted that young people who are pushed ahead will be robbed of a carefree childhood and that they will likely "burn out" before they can produce anything worthwhile. Furthermore, there are those who contend that to allow academically talented young people to move ahead deprives their nongifted age peers of valuable role models.

The available research evidence does not justify any of these concerns. Indeed, the available data tend to suggest the opposite conclusion. Stability in rate of intellectual development from one age to another cannot, of course, be guaranteed, but longitudinal studies indicate that, on the whole, individuals who are significantly advanced at one age tend to be similarly advanced at subsequent ages (Burks, Jensen, & Terman 1930; Terman 1925; Terman & Oden 1947, 1959). As is well known, the older the child, the greater the stability. Even for children whose academic achievement does not keep pace, however, it is quite possible that retention in age-grade has exerted a dampening effect on development. All of the evidence we have suggests that, as a group, gifted children who are educationally accelerated tend to experience satisfying childhoods and that they are productive and relatively content with their positions as adults (Burks, Jensen, & Terman 1930; Terman & Oden 1947, 1959).

Finally, nongifted children may indeed be deprived of role models when their gifted age-mates are placed in special classes. When the gifted children are simply moved to other, higher-level classes, however, they can continue to provide models of high achievement and motivation to their (somewhat older) classmates. Presumably, talented children will make a greater contribution to their classmates when they are challenged than when too little is demanded of them.

Rationale for a Competency-Based System of Education

Perhaps the most cogent reason for an age-graded system of education is the lack of hard evidence conclusively demonstrating that any other system produces more beneficial results. Even though acceleration does not lead to the evils that have been attributed to it, there is little evidence as yet which indicates that children who are denied the opportunity to move ahead according to their abilities and academic attainments are harmed. Indeed, evidence that acceleration produces benefits lasting into adulthood is sparse as well.

Yet, despite the lack of hard data concerning the consequences of accelerating or decelerating academically gifted children, there is good reason to believe that forcing them to conform to a rigid age-graded system may have harmful consequences. Those who have worked with precocious children have often noted their boredom and frustration (Hollingworth 1942; Newland 1976; Terman 1925). Whatever one's theoretical view, it is clear that a child exposed to a too-easy curriculum day after day has little alternative but to "tune out" and "turn off."

Perhaps more serious is the fact that gifted children in an age-graded

educational system are seldom encouraged to develop good study habits, habits of application and perseverence in the face of difficulty. The child for whom everything comes easily may learn to expect that everything *should* come easily. He or she may be made anxious and discouraged when faced with a degree of challenge or even a minor failure that a less capable student would take in stride. Encounters with adversity may have devastating effects, including avoidance of difficulty, feelings of self-abasement, and even withdrawal from college or graduate study.

It is obvious that academically advanced young people are required to waste time. Enrichment programs can help them fill up time, of course, and expand their horizons, but in a typical enrichment program there is likely to be a wide range of children, from those with capabilities several months to several years beyond those of their age-mates. Almost inevitably, then, the enrichment class suitable for the mean of that class will be little better suited to some children than the program of the "regular" class from which they came. The problem of the match will not have been solved.

Many gifted children who are deviant in their school situation are isolated and lonely, particularly those with very precocious capabilities (Hollingworth 1942). Such children seldom become class presidents, cheerleaders, or editors of their school paper. They are likely, rather, to be regarded by teachers and classmates as "smart alecks," "class clowns," or "misfits." The social consequences of engaging all day with their "peers" (actually, their age-mates) are negative rather than positive.

In summary, gifted children are deviant and therefore they are at risk. Doing nothing – failing to accelerate children who seem ready for more advanced educational placement – is not necessarily the safest course. Using their best judgment on behalf of the individual child, courageous educators need to try to adapt the system to the child with special needs. One cannot expect them to do so perfectly. One can only ask them to try in the best-informed ways feasible.

Programs of Radical Acceleration

The outcome of such reasoning implies that matching the competencies of many children to the learning environment may demand extraordinary measures. On the one hand, children may be educated individually by tutors or, worse yet, given no guidance while left to pursue academic goals on their own. On the other hand, they may be permitted to attend classes with older students, with a teacher, the "props," and the social facilitation that only classroom learning can provide. Choosing the latter alternative, at least two investigators during the early 1970s became convinced that

accelerated educational experiences can be appropriate for some gifted children, and that for extraordinarily precocious children acceleration may well be essentially mandatory.

THE STUDY OF MATHEMATICALLY PRECOCIOUS YOUTH

In 1971 Julian C. Stanley, professor of psychology at The Johns Hopkins University, initiated his Study of Mathematically Precocious Youth. He sought to identify and recognize the achievements of a large number of young people who were significantly advanced in mathematical reasoning ability and to give special assistance to those with extraordinary talent. His program was designed to facilitate the appropriate education of such talented young people. Under the auspices of SMPY he has been influential in the lives of many thousands of mathematically talented young people.

Many of the children thus identified have undergone accelerated educational programs, some with the aid of special, preparatory "fast-math" programs provided under Dr. Stanley's direction on the campus of Johns Hopkins (see Benbow, Perkins, & Stanley, chapter 4 of this volume). Many have skipped grades or have taken advanced mathematics and related courses while pursuing other studies in settings with students closer to their age. A good many of the students identified by Professor Stanley have entered The Johns Hopkins University, thereby assuring the personal support of Professor Stanley and his staff, though no formal program especially for them has been undertaken.

A few of Professor Stanley's protégés have been radically accelerated, i.e., they have become full-time college students when only 10 to 13 years old. A description of a few of these students will provide a sense of the kind of youngster involved in radical acceleration.

C-B.C. is one of the brightest students identified by any SMPY talent search. In December, 1975, one month after his tenth birthday, he took the SAT in a regular administration and scored 600 Verbal and 680 Mathematical; one year later he raised these scores to 710 and 750, respectively. A variety of intelligence test scores indicated an IQ of about 200. A Chinese-American youngster whose father is a professor of physics and whose mother has a master's degree in psychology, C-B. has two younger siblings who are also very bright. He attended a private school in Baltimore, where he was given some special opportunities.

It was discovered that, although C-B. had taken only first-year high-school algebra (as a fifth-grader), he had acquired by age 11 the subject matter of algebra II, algebra III, and plane geometry. Trigonometry took him a few weeks to learn, as did analytic geometry. At age 12, while his father was doing research using the linear accelerator at Stanford Univer-

sity, C-B. completed his high-school career in Palo Alto while simultaneously taking demanding calculus courses at Stanford. In the fall of 1978, when still 12 years old, C-B. entered The Johns Hopkins University with sophomore standing. He had been accepted at Harvard and California Institute of Technology as well. He received his baccalaureate in May of 1981, at age 15, with a major in physics, general and departmental honors, the physics award, a Churchill Scholarship for a year's study at Cambridge University, and a National Science Foundation three-year graduate fellowship to work toward his doctorate in physics at the California Institute of Technology.

C.F.C., born in 1959, completed his doctorate in finance before his twenty-second birthday at the University of Chicago Graduate School of Business, after earning his MBA there when he was 19. C.'s father, a college graduate, is a sales manager; his mother, a high-school graduate, is an executive secretary. C. skipped grades seven, nine, ten, and twelve and entered Johns Hopkins with sophomore standing through Advanced Placement Program course work and college credits earned while attending the eighth and eleventh grades. He held a variety of jobs while in college, including summer jobs as a staff writer on a weekly publication and a junior security analyst covering publication stocks. His hobbies include skiing, tennis, golf, horseracing, and writing. Several letters written during graduate school reflect not only the substance but also the style of a student well into his twenties. With several research publications already to his credit, he joined the faculty of the Graduate School of Management of Northwestern University in the fall of 1981.

B.J.T. was born in 1967, one of four children of the owner of a data-processing company. In May, 1979, while still only 11 years old, he achieved high marks on the AP mathematics examination (Calculus Level BC) and on both of the difficult Level C AP physics examinations (Mechanics, and Electricity and Magnetism). One year later he scored extremely well on the AP chemistry examination. On the calculus examination he was, indeed, one of the highest scorers in the country. At age 10 years 7 months he scored 770 on the SAT-Mathematics and 590 on the SAT-Verbal tests. Later that year he took a fast-paced mathematics program at Johns Hopkins for brilliant ex-seventh-graders. B.'s family lives in New Jersey, where in the fall of 1980, shortly after his thirteenth birthday, he entered Princeton University as a full-time student. Princeton does not award sophomore-class standing for AP scores, and he therefore entered as a freshman but with advanced standing in mathematics, physics, and chemistry. Apparently he is doing well academically and also from a social/emotional perspective as well.

A final example from the SMPY program is L-H.R., a young woman born in 1967 who in January of 1980 earned SAT scores of 760 on the Verbal segment and 790 on the Mathematics segment. She hopes to be a

medical researcher. During the summer of 1980 she carried a full-time course-load at Johns Hopkins by taking organic chemistry. At 13 years of age she became a full-time resident student there with sophomore-class status. She is doing well.

Many more boys than girls have achieved extremely high SAT-M scores in the SMPY talent searches (Benbow & Stanley 1980, 1981), and an even smaller proportion of young women have entered college as radical accelerants from that program (Daggett, chapter 9 of this volume). L-H. appears to be one of the most intellectually talented of the girls identified so far.

One of the most remarkable students in Johns Hopkins's history is N.T.M., a first-generation American from Oklahoma whose parents immigrated there from Japan. She skipped the twelfth grade of her public high school and came to Johns Hopkins with full sophomore-class standing via five AP examinations taken in one week during May of her eleventh-grade year on which she had earned four 5s and one 4 on the 1-to-5 grading scale. By taking heavy course-loads of difficult courses, she completed the B.A. degree in mathematics in a total of four semesters with nearly all *A*s and was elected to membership in Phi Beta Kappa. Besides earning her baccalaureate at age 18 with both general and departmental honors, she became one of the youngest persons ever to win a Rhodes Scholarship with which to study for two years at Oxford University and a Churchill Scholarship with which to study for one year at Cambridge University. Having to make a choice between the two scholarships, she chose the Rhodes.

N.T. had won the state piano competition as a tenth-grader, competing with eleventh- and twelfth-graders. While at Johns Hopkins she minored in piano at the Peabody Institute. She plays the flute excellently and also the violin. At the end of the eleventh grade she attended Girls' State, a political-experience camp, in Oklahoma and was elected president of it. At Johns Hopkins she was a member of the varsity women's fencing team. In addition to these accomplishments, she is a skilled teacher of fast-paced mathematics through the calculus to SMPY's youths who reason extremely well mathematically. Also, during the summer of 1982, after graduation from Johns Hopkins, she worked as a junior researcher in mathematics and physics at the Bell Telephone Laboratories.

These examples give a flavor of the outstanding students located by Professor Stanley and his co-workers at Johns Hopkins. These young people not only appear appropriate for marked acceleration in their studies, but indeed would very probably be seriously handicapped by the requirement that they complete their regular schooling at the ordinary, prescribed pace.

THE CHILD DEVELOPMENT RESEARCH GROUP

Shortly after Professor Stanley established SMPY, efforts were begun at the University of Washington, under my directorship, to investigate aspects of intellectual precocity. In 1973 the Child Development Research Group was established and undertook a formal study of the identification and nurturance of very young, highly precocious children. This group has now established a broad spectrum of research and educational programs, including: (1) a longitudinal study of some 500 gifted youngsters identified by the age of five as exhibiting precocious development, (2) a preschool serving a segment of these youngsters, (3) an accelerated educational program in the Seattle Public Schools intended for children achieving four grades or more above their age-mates, (4) a diagnostic and counseling center serving families with children who seem to be experiencing school and/or behavioral problems related to markedly advanced intellectual development, and (5) a program of early entrance to the University of Washington for very academically talented young people.

For the purposes of the present paper, the Radical Acceleration Group of the Early Entrance Program, which accepts students to the University of Washington who are age 14 or younger and/or who have not yet entered the tenth grade, will constitute the focus.[1] This program began in the spring of 1977 with two students, a 12-year-old girl and a 14-year-old boy, each of whom enrolled part time while attending junior high school. By 1981 it had grown to twenty students who were taking part-time or full-time academic loads. Two of these students transferred to a small, residential college, but the other eighteen were located on the university campus in Seattle.

To qualify for admission to the EEP a student must be 14 years old or younger and/or not yet in the tenth grade, have demonstrated high academic achievement, and have attained scores on the Washington Pre-College Test (Noeth 1979) that compare favorably with those of high-school juniors who subsequently enter four-year colleges. Specifically, the applicant must attain a score at the eightieth percentile or better of that group on either the verbal or the quantitative portion of the test and a score at least at the fiftieth percentile on the other segment. Applicants are thus being compared with norms appropriate for college-bound students, who are at least four years, and sometimes as much as eight years, older. Applicants must also be judged strongly motivated to enter the program and be prepared to exert the effort and maturity needed to succeed in college courses.

Having qualified, students are invited to enroll in University of Washington courses concurrently with the pursuit of their elementary- or

junior-high-school programs. Having succeeded at a few such courses, the student can attend a summer quarter at the university, taking a variety of college courses (not just "favorites"). Thirty-two students have entered the EEP; eleven of them opted during the gradual screening process to return to their former schools, and one other was required to do so, with the possibility of returning to the program at a more propitious time. The majority of those who started the process have, however, entered the university on a full-time basis, at ages which thus far have ranged from 10 to 14 years.

The following is a presentation of our experience up to January 1, 1981; the left-hand column indicates the number of students in that category.

172	Took the Washington Pre-College Test
46	Qualified for the Early Entrance Program
32	Entered the EEP and took one or more courses
20	Were still students in good standing in the EEP
8	Dropped out after attempting only one university course
4	Dropped out after attempting two or more courses

About one-quarter of those who were nominated by a teacher, counselor, or parent qualified to try out for the EEP by taking college classes. Approximately two-thirds of those who qualified elected to take at least one university course, and more than one-half of these actually proceeded through the probationary period and became full-time university students.

The deficiencies in the education of EEP students when the students enter the university make it necessary to add required courses to their programs. For this reason, and because students are encouraged to explore a variety of potential career options and to obtain a broad, well-rounded education, a typical program will take about five academic years.

The EEP provides guidance and a home base for these young students, acting far more actively in loco parentis than is the custom in colleges today. This is particularly true of the first two years of the students' college lives, after which many begin to feel that they have "outgrown" the program. During their beginning college years the students are required not only to use the various departmental and college advising offices, but also to check programs and program changes with EEP counselors. Their own talents and the special university requirements must be carefully intermeshed. Progress in their courses is monitored by mid-quarter student interviews, end-quarter contact with professors, and written course evaluations by the students. Group meetings are held twice weekly; at these, attendance is mandatory during the first year and is encouraged during the second. The group meetings are used to furnish an orientation to the university community and the study/social skills needed in this setting. They also provide an opportunity for students to share the problems (and the solutions) they are experiencing. A lounge provided serves as a "home

base." Conferences are held with parents as needed. The program plays an important role in the lives of the students, at least at times of crisis and/or decision. For the most part, however, youngsters are simply University of Washington students. They attend regular classes, eat at university facilities, participate in the extracurricular activities they choose, and assume responsibility for their own scholastic achievement. All are required to live with their families (or, occasionally, in some nonfamily home setting) when they enter the program, but approximately 85 percent of the undergraduate population of approximately 36,500 students also live off campus. The EEP students have done well. Table 8.1 presents in capsule form the standing and academic progress of the group through 1980.

By far the majority of the EEP students who have made the transition to full-time status are progressing handily through their college careers, taking a variety of courses, meeting university requirements, choosing (and often rechoosing) majors, and generally acquitting themselves with success, poise, and an air of optimistic self-confidence. All the students have made friends not only within the program but also with college classmates, though the extent of these friendships varies, of course, from one student to another. As a group they appear to be socially skilled, committed to their own endeavors, and making satisfactory progress. Such matters are hard to quantify, but the overall situation appears to be quite salutary.

This is not to say that these young people have experienced no problems. Many of them were socially rather isolated when they applied to the program, having been considered very different from their classmates and having had a difficult time finding compatible friends. Some have been at times less mature than they needed to be in the university milieu.

One set of problems stems from conditions inherent in the lock-step educational system from which the young people come. Few of them, for example, had previously learned to take good notes. A few who skipped the third and fourth grades still print rather than write cursively. More serious, most of them have not learned to manage time well because they have never had to do so. Indeed, with regard to schoolwork, they have generally had a great deal of time to waste; they have almost never had to study at home.

The structure of our young students' lives tended to have been imposed by others – parents who have determined when they should go to bed and how much TV they should watch, for example. Students who have engaged in demanding activities such as competitive athletics or serious study of a musical instrument, drama, or dance seem to have learned to use their time better and to expect (and even relish) challenges.

A few students have not handled the freedom of the university well. They spent too much time playing with the computer or chatting with

TABLE 8.1. Status of EEP Students after Autumn Quarter, 1980

Level	*N*	Total Credits	Grade Point Average
Freshman (- to 44 credits)	4	169	3.49
Sophomore (45 to 89 credits)	7	322	3.45
Junior (90 to 134 credits)	4	291	3.53
Senior (135 to - credits)	3	394	3.62

friends, or they simply did not apply themselves to their studies. They expected to complete the university courses as they have always completed their school requirements – easily, "without opening a book." When this tactic proved unsuccessful, some became discouraged, cut classes, and tended to sink deeper into failure. Program staff try to help students to monitor their time and their school progress, particularly during the first year. This task, however, has been difficult with some students to whom everything has always come so easily and whose parents have so willingly taken responsibility for providing the "good life."

Perhaps surprisingly, the social maturity of these young people has tended to exceed by a considerable degree that of their age-mates. The important variable here seems to be the age at which the youngster enters puberty. All of the female students who have been full-time students at the university were post-pubescent. Their social maturity has tended to be fully adequate to handle the campus situation. Most of these girls, in fact, made close female friends within the program and, in addition, established male (and sometimes female) friendships with their non-EEP classmates. Some have dated and some have not, but their friendship patterns have seemed to be mature and gratifying to them.

A number of our boys, on the other hand, were prepubescent, still "children" in appearance as well as demeanor. They have not blended into the campus setting as did the more mature EEP students. They did not tend to make friends outside the program as did the post pubescent boys For the most part, however, they seemed to be quite content with their lifestyles. A few have continued their neighborhood friendships and athletic activities outside the university. Our young boys have tended to rely on their parents for transportation and for structuring their lives; this in turn has postponed their assumption of responsibility for themselves and has led to a high degree of involvement of their parents with EEP staff. As the boys reach puberty this state of affairs has diminished and a natural progression can be seen.

With the girls and the postpubescent boys, issues of dependence-independence have tended to become rather critical. Some students have manifested a strong desire to become more a part of the college community by moving away from home. Of the nine girls in the program, two transferred to a small, residential college in Oregon and one lived in a cam-

pus cooperative; of the eleven boys in the program, one lived in a dormitory. The youngest of this subgroup was 15, and the others were 16 or 17. The parents in each case agreed reluctantly to permit their child to move from home. The recognition that their age-role expectations must be determined in part by the circumstances in which their child functions has come easily to few of the parents.

Any group of adolescents has its share of crises and conflicts, and our group is certainly not atypical in this respect. There have been, as far as we know, practically no problems with some hazards originally anticipated, such as alcohol or drug use, psychiatric disorders, or sexual encounters exceeding the student's capacity to handle them. Staff members have, however, been called to mediate between child and parents and make themselves available for that purpose. Parent meetings are held quarterly and often become "rap" sessions at which parents share their experiences and provide mutual support. Indeed, in some ways the problems that have been encountered have been more acute for parents than for their children.

On the whole, both the academic and the social progress of this group of highly capable young people has been very satisfactory. The following sketches introduce a few of our group and provide a multifaceted picture of the kind of young person who enrolls in the EEP. As this diverse group indicates, each student is so distinctive an individual that it is almost impossible to pick a "typical" one.

F.M.Q. was one of the first students to enter the program, in spring quarter, 1977. She is the youngest of four children of two university faculty members. At age 12 years she enrolled in college calculus and astronomy courses while attending a private middle school in Seattle; she had had only introductory algebra at this point. She earned *A*s in both courses and experienced no difficulties in adjusting to the university. Her parents, though, were apprehensive about her becoming a full-time college student and enrolled her in a private high school with high academic standards. She was skipped a grade but still remained insufficiently challenged; she consequently took a second calculus course at the university during spring quarter, 1978. She entered the EEP as a full-time student that summer. F.'s Washington Pre-College Test at the age of 12 years 8 months yielded a Verbal composite of 55 (sixty-fifth percentile) and a Quantitative composite of 66 (ninetieth percentile). Her SAT scores at the age of 13 years 7 months were 630 Verbal and 750 Mathematics. As a youngster who had long been interested in physics and mathematics, she enrolled in the undergraduate honors program and undertook a major in each of these areas. During the summer of 1979 she worked at the Nuclear Physics Laboratory, and as a sophomore she was appointed as a teaching assistant for the first-year physics program. At the end of the 1979–80 academic year she had attained a grade point average (G.P.A.) of 3.72 and senior status. She and a close friend within the program transferred to Reed Col-

lege in 1980, where she decided to stay for two years in order to obtain an enriched liberal arts background in addition to a combined physics-mathematics major. Socially poised and mature beyond her years, she experienced some conflicts with her parents over her new independence. For the most part, however, she had a relatively smooth and certainly a successful academic career.

T.G., the oldest of four children of a Chinese-born physician father and biochemist mother, was 10 years old in 1978 when he entered the university as a part-time student. He had been a very unhappy first-grader in public school and had been enrolled the following year in an ungraded private school. After only one year he returned to a public school as a fifth-grader and then proceeded to advance rapidly through junior-high-school and high-school subjects, particularly in the mathematics and science areas. T.'s Washington Pre-College Test taken at the age of 9 years 4 months yielded a Verbal score of 63 (eighty-seventh percentile) and a Quantitative score of 58 (sixty-fifth percentile). The SAT taken at the age of 9 years 10 months produced scores of 550 Verbal and 630 Mathematics. A very serious boy in general demeanor, T. illustrates the prepubescent student who does not easily blend into the university student body. He had difficulties in learning to budget his time and to accept responsibility for completing his work independently. He would rather work at a computer terminal than finish an English theme or read a history assignment. His intellectual competence, however, was sufficient that he made satisfactory grades despite these problems. Taking notes was particularly difficult for him. At the end of autumn quarter, 1980, he had completed 76 credits with a G.P.A. of 3.56, not the academic level of which he is basically capable, but a record that shows steady progress. He had begun also to exhibit the capability of succeeding at university classes aside from the sciences and mathematics, which he so clearly preferred.

M.B. is not one of our success stories, at least not in the short run. The older of two sons of a widowed father, he entered the university when he was 13. His scores on the Washington Pre-College Test taken when he was 13 years 3 months old, were 67 Verbal (ninety-fifth percentile) and 62 Quantitative (seventy-seventh percentile). He was enthusiastic about all aspects of university life except studying. Weighing at the time less than ninety pounds, he was welcomed as a coxswain on the freshman crew, an activity that he pursued not only during practice hours but socially, at the crew house, during most of every day. A somewhat troubled youngster to begin with, he never managed to apply himself to his courses. Eventually he ceased attending university classes and finally transferred to an alternative public high school. He did not achieve a distinguished record there and remains somewhat troubled. It is clear that his acceptance by EEP and other university students was a distinctly positive experience for him, and the recognition of his considerable academic competence was important to

him as well. On balance, perhaps the EEP was neither particularly helpful nor harmful to M.

E.V.C. was 12 years old when she entered the EEP in the summer of 1978. The oldest of seven children of an intellectually outstanding but economically troubled family, she initially showed a strong preference for the study of classic languages and literature but soon began to explore other areas such as mathematics and science. Her test scores on the Washington Pre-College Test at age 12 years 4 months were 70 Verbal composite (ninety-seventy percentile) and 58 Quantitative composite (sixty-fifth percentile); on the SAT at age 13 years 5 months her scores were 610 Verbal and 540 Mathematics. E. is one of those students who had previously been challenged to assume responsibility and to handle her time well. She is a highly trained dancer, a participant in local dramatic companies, and for several years held paid jobs such as housecleaner and assistant in campus laboratories. She continued to fill her life with these activities, including highly rigorous dancing instruction. At the same time she achieved a G.P.A. of 3.35 for 142 total units. E. generated considerable conflict with her parents over issues concerned with her bids for more independence. These were exacerbated by the fact that she had no clear goals and had not been able to work out a well-defined plan for her education.

N.C. qualified for the program at age 11, as a junior-high-school student. Her Washington Pre-College Test scores included an 87 Verbal composite (eighty-seventh percentile) and a 55 Quantitative composite (fifty-fifth percentile). Her father is an engineer and her mother is a teacher. She has one younger sister, who also is very bright. Entering the program rather gradually, she took courses concurrently at the university and at her junior high school for more than a year. She finally entered the university full time in 1979 and subsequently earned a G.P.A. of 3.55 with a total of 82 units. She is outstanding for her social poise and articulate manner. Clearly mature beyond her years, she established a wide circle of friends, both male and female, within the EEP and among her regular classmates. Her instructors rate her consistently among the brightest in their classes, and several have noted that her ability to express her insights in writing "is extraordinary." In addition to taking a demanding course-load, N. taught French to youngsters in the Transition Component (see note number 1). She assumed all the responsibilities of a course instructor and did an exceptional job. Her pupils were delighted with her and learned very rapidly. N's current major is political science, and she may well be headed for a career in the public arena.

O.P., whose poise and maturity remind one very much of N.C., qualified for the EEP at age 13. She was at that time attending a private parochial high school as a ninth-grader. Her Washington Pre-College Test scores placed her significantly above the ninety-ninth percentile on the

Verbal composite and at the seventy-third percentile on the Quantitative composite. O.'s father is a U.S. prosecuting attorney and her mother has had a varied career in advertising, public relations, and film production. O. began reading at 30 months of age and was academically advanced throughout her school career. She skipped kindergarten altogether and was consistently given difficult work by all her teachers. She was among the most capable students in the program, having accumulated a G.P.A. of 3.79 for 100 units of work. At the same time, she taught German to some of the students in the Transition Component, as N.C. taught others French, and with equal success. Her career plans are in the area of foreign service. She was one of two students nominated by the University of Washington to compete for the coveted Truman Scholarship. With the reluctant support of her parents, she moved into the university's Russian House and handled very well this opportunity for independence and self-determination.

B.J. qualified for the program in 1977, just before his thirteenth birthday, with scores on the Washington Pre-College Test at the eighty-fifth percentile on the Verbal composite and at the fifty-fifth percentile on the Quantitative composite. A dedicated musician with strong interest in composing he recognized that the university offered the major local possibility for formal education in his chosen field. His father is a faculty member at the university, his mother works with an import firm, and his older sister is a university student. They all supported his application to the EEP and have continued to encourage him in his music studies. In winter and spring quarters, 1978, B. took courses in German at the university. Then transferring from junior high school, in which he was doing well, and giving up his activities in the Seattle Little Symphony and the Junior Wind Ensemble, he entered the university full time in autumn, 1978. By the end of the 1979–80 academic year he had accumulated 153 credits, with a cumulative grade point average of 3.75. B. did well in all his classes, which represented a variety of liberal arts and social sciences in addition to his music courses. It is in the music courses that he really distinguished himself, however. To be accepted as a music major, a highly competitive situation at this university, he had to present a folio of his compositions and audition for the faculty. He accomplished this by winter quarter, 1979, when he was barely 14 years old. Most of B.'s friends were regular university students who were also music majors. Much of his time was spent with them, studying, practicing, and composing.

CONCLUSIONS

Here, then, are two programs, one in Maryland and one in Washington, which demonstrate that for some children a radically accelerated educational approach is both appropriate and successful. The two pro-

grams differ somewhat in orientation. The SMPY program has emphasized the discovery and recognition of youngsters talented in a particular area. The University of Washington program has searched far less systematically, but it has provided a somewhat more structured support system to students who have entered the university in their early teens with a variety of talents. The common orientation is, however, very striking. Each program is designed to provide the most appropriate match between learner and environment, using for the most part classes already available in the educational system. The components specific to these programs – the fast-math classes at Johns Hopkins, the Transition Component at the University of Washington – were not undertaken to replace the regular classroom, but to aid the transition, which is difficult in the lock-step age-graded Carnegie-unit educational system today.

In a sense it is unfortunate that case studies involving such unusually precocious and high-achieving youngsters have been presented. This can be misleading. In fact, there are a great many talented young people who are also in need of adjustment in their programs. Although there are many more of the very bright than one would anticipate from the normal curve (see Robinson 1981), there are a great many other youngsters whose precocity is not quite so outstanding but whose needs are being ill served by age-graded practices.

If the school system permitted a significantly greater degree of flexibility, our society might well find itself returning to the "good old days," when children actually passed and failed in school according to their competencies and when, therefore, a mix of ages was to be found in most classrooms. While there would still be a need for radical acceleration of a few students in such a system, these radical accelerants would be less conspicuous in age-heterogeneous classes. No grade-placement system will ever handle entirely the "problems of the match" created by inter- and intraindividual differences (e.g., see Stanley 1980). Flexibility in the system and recognition of the problem, however, might advance us a significant step toward meeting the educational needs of gifted and talented youngsters.

Notes

In March, 1981, shortly after completing this chapter, Professor Robinson died tragically. His program, which is outlined in this chapter, is continuing at the University of Washington under the direction of Professor Nancy Robinson, his widow. Although the program has changed and matured, it is largely along the plans that Halbert Robinson outlined but did not see come to fruition.

1. Before his death, Dr. Robinson had initiated a new component of the EEP – the Transition Component. It is a self-contained program stressing academic preparation for university work and allowing students older than 14 years to take courses as part-time University of Washington students while they acquire necessary basic skills and an orientation to the intellectual life of the university. As of February, 1983, there are nine students currently in the program, thirty-eight who were in the program but have now become full-time students at the University of Washington, six who have now graduated and gone to graduate school (three at the University of Washington and one each at Brown, California Institute of Technology, and MIT), and four who transferred to other schools.

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